DEEPLY ETCHED 1.55 μm WAVELENGTH DISTRIBUTED-REFLECTOR LASERS WITH VERTICAL GRATING

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Abstract

A new type of distributed-reflector (DR) laser with a vertically aligned grating (VG) is proposed and was fabricated using CH_4/H_2 reactive ion etching (RIE) without any regrowth. On the rear facet, a 15-element semiconductor/Benzocyclobutene (BCB) distributed Bragg reflector (DBR) was used to increase the output efficiency and to decrease the threshold current. The threshold current was as low as 12 mA and the differential quantum efficiency as high as 42% from the front cleaved facet under room temperature for 220-μm-long cavity and 6-μm-wide stripe devices. GaInAsP VG-DR lasers with a fifth order grating (Λ = 1200 nm) showed quasi single-mode operation with an SMSR of 35 dB.